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NAUCORIDAE (HEMIPTERA) OF NEW GUINEA. 2. A REVIEW OF THE GENUS *IDIOCARUS* MONTANDON, WITH DESCRIPTIONS OF THREE NEW SPECIES

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Abstract.—The genus *Idiocarus* is reviewed based on recent collections in Papua New Guinea. Three new species, *I. isolatus, I. sepikanus,* and *I. papuus* are described, distribution notes are given for three previously described species, and a key to all species is provided, accompanied by figures of the male and female genital structures. *Idiocarus litus* La Rivers is reduced to a junior synonym of *I. elongatus* Montandon.

The genus *Idiocarus* was proposed by Montandon (1897) to contain *I. elongatus* from southeastern New Guinea, and the genus as a whole appears to be confined to the upland areas of that island. La Rivers (1971) added three additional species, *I. intermedius, I. litus,* and *I. minor,* and provided a key to the species. That key, however, is of limited usefulness, being based on superficial characters and accompanied by but a single habitus illustration. Our recent collections in Papua New Guinea have revealed three new species, *I. isolatus, I. sepikanus,* and *I. papuus,* which are described herein; we also provide a new key to the species in the genus and illustrations of the male and female genitalia.

Idiocarus is a member of the subfamily Cheirochelinae as defined by Usinger (1938, 1941), with the anteclypeus produced anteriorly over the labrum and the vertex produced posteriorly behind the eyes. The head modifications of *Idiocarus* species are much less developed than in other cheirocheline genera, particularly the anteclypeus which barely projects beyond the apex of the well-developed labrum. The maxillary plates lie in a vertical plane, with their pointed tips produced and nearly reaching the anterior anteclypeal apex, a condition not encountered elsewhere in the Cheirochelinae. In most populations the majority of individuals are brachypterous, with wing pads reaching only to the third abdominal segment. Among macropterous individuals, the wing membrane frequently disintegrates over time, leaving only the pointed hemelytra in a condition approximating brachyptery. The abdominal venter bears several unique structures, including depressed ovate areas of shining hairs laterally on the paratergites, raised hair clumps covering the spiracles, and paired slit-like openings in the hydrofuge pile near the inner margins of the paratergites. These modifications are similar to structures observed in the Neotropical genus *Cryphocricos* (Parsons and Hewson, 1974), and may serve in a similar role as hydrostatic pressure receptors. The morphological resemblances between the two genera are striking, originally leading Montandon (1897) to place both in his subfamily Cryptocricinae, but this resemblance would appear to be the result of convergent evolution in similar environments, since a character analysis indicates that *Cryphocricos* is allied to *Cataractocoris* and other Neotropical genera presently held in the Ambrysinae while *Idiocarus* is allied to *Sagocoris* and other primitive members of the Asian Cheirochelinae.

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Externally, most species of *Idiocarus* are quite similar, differing primarily in habitus characteristics that are difficult to express in a key. Although external characters are employed in the key, workers should anticipate that these may prove unstable, and dissection of the male genitalia is recommended for definitive identification. At present scant material is available from the Indonesian province of Irian Jaya, comprising the western half of New Guinea, and it is anticipated that future collections in this region will yield additional undescribed species.

Idiocarus species are found under small to moderate sized stones in cool, swiftly flowing streams at elevations ranging from 200 to 1,700 meters (ca. 500 to 5,000 feet) above sea level. This genus was not encountered in the very cold mountain streams above this elevational range, where species of the allied genus *Tanycricos* were abundant, or at low elevations in the coastal ranges, where freshwater crabs and other crustaceans occupy typical *Idiocarus* habitats. Plastron respiration is unknown in any of the New Guinea Naucoridae, but may occur in *Idiocarus* species considering their habitat and morphological resemblance to the genus *Cryphocricos* in which plastron respiration is known (Parsons and Hewson, 1974). In particular, the prevalence of brachyptery and presence of apparent hydrostatic pressure receptors in both genera argues for such a convergence.

All material cited in this paper is held in the J. T. Polhemus collection (JTP) unless otherwise noted; all new species types are deposited in the Bishop Museum, Honolulu (BPBM). We are indebted to Dr. P. H. Arnaud, California Academy of Sciences, San Francisco (CAS), Dr. C. L. Hogue, Los Angeles County Museum (LACM); Dr. W. R. Dolling, British Museum (Natural History), London (BMNH), and Dr. P. H. van Doesburg, Rijksmuseum Van Natuurlijke Historie, Leiden (RNHL) for the loan of specimens. Proportions are given in units, with 40 units = 1 mm. CL numbers refer to codes used by the authors to reference ecological notes. This research was supported by a grant from the National Geographic Society, Washington, D.C.

KEY TO THE SPECIES OF *Idiocarus* MONTANDON

1. Prosternal carina prominent, ridge-like, shining and uninterrupted; female subgenital plate bearing hair tufts basally (Fig. 13); male left paramere with tip enlarged, rounded (Fig. 6); small species, overall length 8 mm or less .... *I. minor* La Rivers
– Prosternal carina not forming a prominent shining ridge over most of its length, interrupted at least once by shallow transverse sulci; female subgenital plate with or without hair tufts basally; male left paramere with tip not greatly enlarged, though often hooked (Figs. 2–5, 7); overall length usually exceeding 8 mm 2
2. Fore femur lacking raised black tubercles on anterior portion of dorsal face; female subgenital plate with hair tufts basally (Fig. 10); male left paramere gently curving, tip slender (Fig. 4); brachypterous forms usually reddish, frequently with tip of abdomen upturned .... *I. intermedius* La Rivers
– Fore femur bearing raised black tubercles on anterior portion of dorsal face; female

subgenital plate lacking basal hair tufts; male left paramere with tip rounded or hooked, not slender and tapering (Figs. 2, 3, 5, 7); brachypterous forms generally brown or yellowish with dark mottling, not reddish, tip of abdomen usually not upturned 3

3. Posterior margin of female fifth abdominal sternite sinuate (Fig. 8); male left paramere with long straight arm, tip rounded (Fig. 2) .... *I. papuus,* new species
– Posterior margin of female fifth abdominal sternite smoothly curved or straight (Figs. 9, 11, 12); tip of male left paramere more or less hooked (Figs. 3, 5, 7) 4
4. Ventral face of fore femur bearing prominent raised black tubercles anteriorly; large, robust species, overall length clearly exceeding 10.5 mm; male left paramere massive basally, tip curved and hooked (Fig. 7) .... *I. elongatus* Montandon
– Ventral face of fore femur lacking prominent raised black tubercles anteriorly, although often bearing smaller brownish tubercles; smaller species, overall length clearly less than 10 mm; male left paramere not massive basally (Figs. 3, 5) 5
5. Projecting prosternal tooth attaining or exceeding distal end of second visible rostral segment; male left paramere broadened basally (Fig. 3); coloration predominantly light yellowish brown .... *I. sepikanus,* new species
– Projecting prosternal tooth reaching at most only to middle of second visible rostral segment; male left paramere slender basally (Fig. 5); coloration predominantly dark brown .... *I. isolatus,* new species

Idiocarus elongatus Montandon

Figs. 7, 12

Idiocarus elongatus Montandon, 1897:8.
Idiocarus elongatus, Lundblad, 1933:62.
Idiocarus elongatus, La Rivers, 1971:20.
Idiocarus litus La Rivers, 1971:25. **New Synonymy**.

This species, the largest in the genus, is easily recognized by its size (overall length exceeding 10.5 mm) and robust habitus, the heavily tuberculate fore femora, and the hooked tip of the male right paramere (Fig. 7). Montandon's macropterous female type came from Haveri, on the Paumomou River in southeast New Guinea, a locality we have been unable to accurately locate; specimens are at hand from drainages in the Owen Stanley Range of southeast New Guinea and the Central Highlands.

An examination of the male holotype of *Idiocarus litus* La Rivers from "PAPUA, Dogura" (probably in the vicinity of Port Moresby, Central Prov.) reveals it to be a specimen of *I. elongatus* Montandon on the basis of the male genitalia; *I. litus* is thus placed as a junior synonym of *I. elongatus.* The majority of the paratypes designated by La Rivers (1971) represent *I. papuus,* new species, and it seems likely that La Rivers intended his name *I. litus* to apply to this latter species but inadvertently selected a small specimen of *I. elongatus* as his holotype. *I. papuus* and *I. elongatus* occur sympatrically in the Central Highlands; specimens of the former species from higher elevations are often larger than those from the lowlands, however the internal male genitalic structures are diagnostic.

Material examined. PAPUA NEW GUINEA. *Central Prov.:* 7♂♂, 12♀♀, 4 nymphs, Eio Creek, nr. Baruanumu, CL 1840, 22.IX.1983; 7♂♂, 1♀, 4 nymphs, Musgrave (Aieme) River at Awarere Plantation, CL 1841, 22.IX.1983; 2♂♂, 1♀, stream nr. Musgrave River, CL 1842, 22.IX.1983; 2♂♂, 1♀, 3 nymphs, Laloki River, 15 km N of Port Moresby, CL 1845, 22.IX.1983. *Western Highlands Prov.:* 2♂♂, Baiyer River bird sanctuary, CL 1792, 8.IX.1983 (all above collected by J. T. and D. A. Polhemus, in JTP). *Province uncertain:* 1♂, Papua, Dogura, 20.VIII.1959 (E. L Cassidy) (*I. litus* holotype, CAS); 1♀, SE New Guinea, Haveri, 7.XI.1893 (Loria) (*I. elongatus* holotype, BMNH).

Idiocarus intermedius La Rivers
Figs. 4, 10

Idiocarus intermedius La Rivers, 1971:23.

This moderate sized species, described from the Star Mountains of Western Province, may be recognized by the non-tuberculate fore femora, the hair tufts at the base of the female subgenital plate (Fig. 10), the slender, curving male left paramere (Fig. 4), and the general coloration, which is pronouncedly reddish in brachypterous specimens. Though superficially similar to *I. papuus,* new species, it is morphologically distinct on the basis of pronotal structure (more massive and robust in *I. intermedius*) and genitalia. The two species are geographically sympatric, but *I. intermedius* occurs at higher elevations, and although widely distributed in the mountainous regions of the island appears to be much less common in collections. This species also appears to prefer fast current speeds, since the longest series were taken in violently rushing, cold waters.

Material examined. PAPUA NEW GUINEA. *Morobe Prov.:* 17♂♂, 9♀♀, 6 nymphs, Big Wau Creek at Wau, 1,036 m (3,400′), CL 1819, 16.IX.1983; 2♂♂, 2♀♀, 5 nymphs, Poverty Creek, Mt. Missim, 1,600 m (5,249′), CL 1830, 18.IX.1983; 1♂, 1♀, Bulolo River at Wau, 899 m (2,950′), CL 1815, 16.IX.1983; 1♂, Kauli Creek, nr. Wau, CL 1826, 17.IX.1983; 1♂, Wampit River, 10.7 km N of Mumeng on Wau road, 900 m (2,953′), CL 1833, 19.IX.1983 (all above collected by J. T. and D. A. Polhemus, in JTP). *Western Highlands Prov.:* 1♀, 1 nymph, Baiyer River, 27 km N of Mt. Hagen, CL 1792, 6.IX.1983 (J. T. and D. A. Polhemus) (JTP). *Eastern Highlands Prov.:* 2♂♂, 2♀♀, Chimbu Valley, Bismarck Range, 1,524–2,315 m (5,000–7,500′), X.1944 (P. Darlington) (CAS); 2♀♀, Goroka, 30.VI.1969 (I. La Rivers) (CAS). IRIAN JAYA: 1♀, Ok Temna, Star Range, 1,500 m, 19-V.1959, Mus. Leiden Neth. New Guinea Exp. (RNHL); 1♂, Sibil Valley, Star Range, 1,260 m, IV. 1959, Mus. Leiden Neth. New Guinea Exp. (*I. intermedius* holotype, RNHL).

Idiocarus minor La Rivers
Figs. 6, 13

Idiocarus minor La Rivers, 1971:28.

The smallest species in the genus, *I. minor* can be recognized by its diminutive size (overall length 8 mm or less), the blunt, rounded male paramere (Fig. 6), the hair tufts on the female subgenital plate (Fig. 13), and the prominent prosternal carina. This species appears to be widely distributed in the central highlands and the Owen Stanley Range, although by far the majority of specimens have come from the vicinity of the type locality at Wau. These insects prefer substrates of small diameter gravel in cold, shallow water, and have not been taken at elevations below 800 m (ca. 2,600′).

Material examined. PAPUA NEW GUINEA. *Morobe Prov.:* 1♂, Big Wau Creek at Wau, 1,036 m (3,400′), CL 1819, 16.IX.1983; 3♂♂, Poverty Creek, Mt. Missim, 1,600 m (5,249′), CL 1830, 18.IX.1983; 30♂♂, 21♀♀, Wampit River, 10.7 km N of Mumeng on Wau road, 900 m (2,950′), CL 1833, 19.IX.1983 (all above collected by J. T. and D. A. Polhemus, in JTP); 1♂, 1♀, Mt. Missim, 1,290 m (4,231′), 9.IV.1966 (G. Lippert) (paratypes, BPBM); 3♂♂, 1♀, Hospital Creek, nr. Wau, 1,143 m (3,750′), 20.X.1964 (W. G. and J. L. Peters) (LACM). *Western Highlands Prov.:* 1♂, Trauna River, nr. Baiyer River, CL 1793, 8.IX.1983 (J. T. and D. A. Polhemus) (JTP); 2♂♂, 1♀, Mt. Hagen, 1.VII.1969 (I. La Rivers) (CAS).

Idiocarus isolatus, new species
Figs. 5, 9

Description. Brachypterous form: Of small size, ovate, habitus as in Figure 1. General coloration dark brown, with scattered yellowish brown areas on head, pronotum, and abdomen. Length 8.00 mm; maximum width 3.87 mm.

Head dark brown, areas adjoining inner margins of eyes yellowish, width/length = 63/53; eyes brown, shining, inner margins straight, convergent anteriorly, separated from head by distinct furrows, these furrows deeper anteriorly, posterior/anterior interocular space = 38/28; anteclypeus well produced anteriorly into a rounded point, covering labrum, apex of head tridentate; labrum rounded, projecting far over base of rostrum; maxillary plates pointed, fuscous, projecting forward beyond anterior head margin; antennae short, yellowish brown, barely projecting beyond lateral margins of eyes; inner margins of eyes sparsely set with long erect setae; vertex well produced behind eyes, curving more sharply basally.

Pronotum dark brown, two (1 + 1) patches behind eyes to either side of midline and stripes along lateral margins yellowish brown, width/length (midline) = 133/45; lateral margins convex, mildly explanate, smooth, set with erect brown setae; posterolateral angles weakly produced, rounded; posterior margin weakly sinuate; surface minutely rugose, shining. Scutellum dark brown, shining, width/length = 93/50; lateral margins sinuate. Hemelytra brachypterous, dark brown, rugose, shining reaching to base of second abdominal tergite; lateral margins explanate, set with long gold setae.

Abdominal tergites I–VI exposed, dark brown, often marked with yellowish brown centrally and along posterior margins; lateral margins set with short stiff gold setae, sparsely set with longer golden hairs.

Ventral surface brown, darker on thorax, abdomen with a golden sheen; ventral keel of head strongly carinate, acuminate apically; prosternal plate weakly carinate medially; mesosternal plate weakly carinate medially, produced to a point distad; static sense organ ovate, gold, shining, located inside lateral pronotal margin near midpoint. Legs yellowish brown; dorsal face of fore femur anteriorly, middle and hind tibiae, infuscated; fore femur heavily set with raised dark tubercles on anterior half of dorsal face, anterior margin adjoining tibia with a fringe of short gold setae, posterior margin bearing a fringe of longer gold setae, a raised row of tubercles present on dorsal midline; fore tibia curved, slightly exceeding adjacent proximal portion of femur; fore coxae with a small row of brown tubercles running lengthwise; middle and posterior femora with two rows of tiny reddish spines running lengthwise along

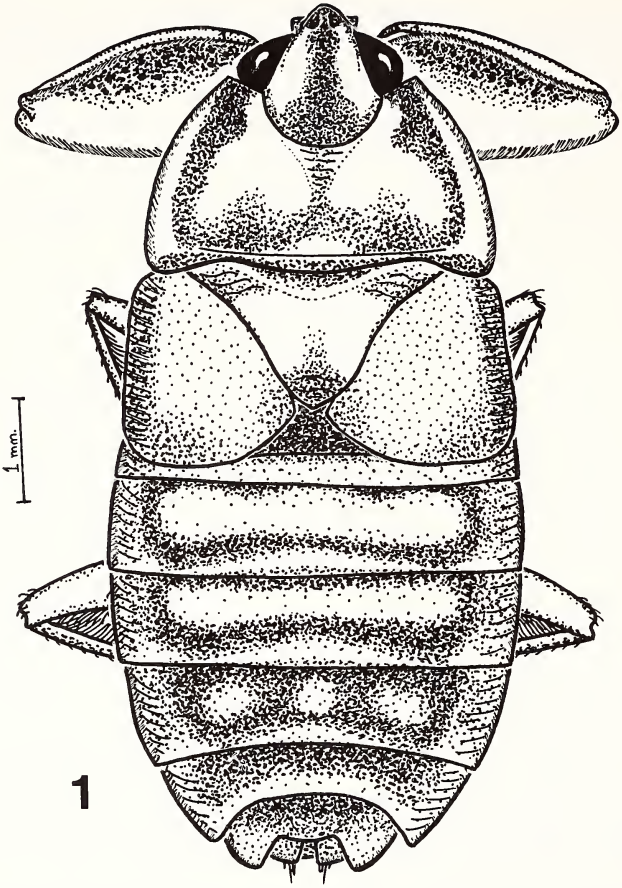


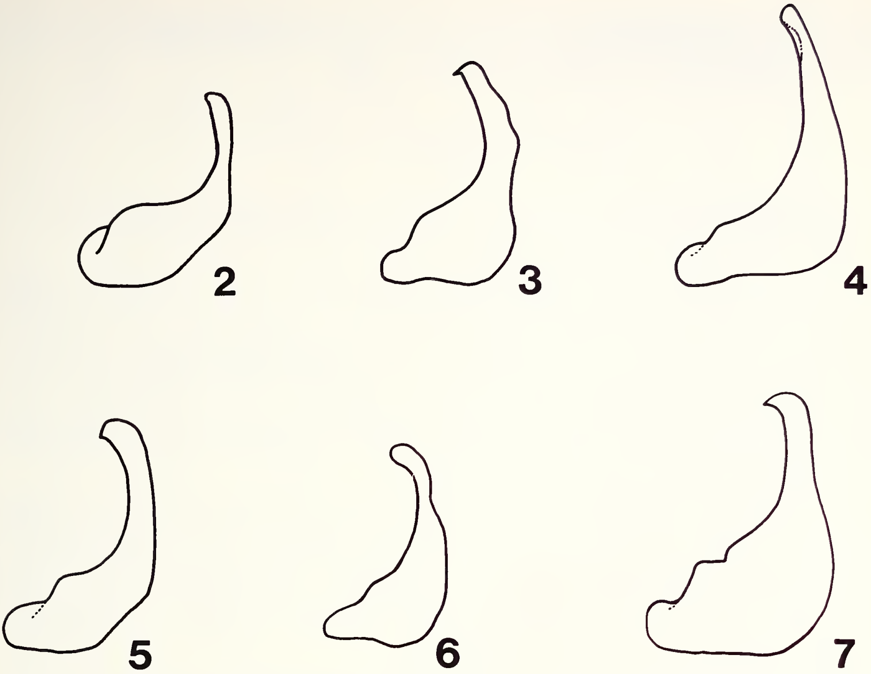
Fig. 1. *Idiocarus isolatus,* new species, brachypterous female, dorsal habitus.

posterior margins; middle and posterior tibiae set with numerous small reddish spines, five transverse rows of stout reddish spines present distally; middle and posterior femora and tibiae bearing long gold swimming hairs; claws sharply bent, yellowish brown, tips infuscated.

Male left paramere curving, weakly acuminate at tip, shape as in Figure 5; male abdominal tergite IV with a distinct indentation along posterior margin; female subgenital plate trapezoidal, tapering evenly, shape as in Figure 9.

Macropterous form: Similar to brachypterous form in size, general structure, and coloration. Wings black, reaching to abdominal tergite VI, surface rugose; clavus and embolium well delineated, membrane smooth. Scutellum enlarged, lateral margins only weakly sinuate.

Material examined. Holotype ♂, and allotype ♀: PAPUA NEW GUINEA. *Western*



Figs. 2–7. Male left parameres of *Idiocarus* species. 2. *I. papuus,* new species. 3. *I. sepikanus,* new species. 4. *I. intermedius* La Rivers. 5. *I. isolatus,* new species. 6. *I. minor* La Rivers. 7. *I. elongatus* Montandon.

Prov.: Ok Mart River at Rumginae, CL 1777, 4.IX.1983 (J. T. and D. A. Polhemus) (BPBM). Paratypes: PAPUA NEW GUINEA. *Western Prov.:* 14♂♂, 12♀♀, same data as types; 2♂♂, 2♀♀, 1 nymph, Wai Somare River nr. Ningerum, CL 1778, 4.IX.1983; 2 nymphs, 10 km S of Ningerum on Ok Tedi road, CL 1779, 4.IX.1983. *Central Prov.:* 3♂♂, 4♀♀, Eio Creek, nr. Baruanumu, CL 1840, 22.IX.1983; 5♂♂, 4♀♀, Musgrave (Aieme) River at Awarere Plantation, CL 1841, 22.IX.1983 (all above collected by J. T. and D. A. Polhemus, in JTP).

Etymology. The name "isolatus" (L., separate) refers to the remote nature of the country in which these insects occur.

Discussion. I. isolatus can be recognized by the absence of raised tubercles on the anterior venter of the fore femur, the shape of the male left paramere (Fig. 5), and the short prosternal projection, which reaches only to the middle of visible rostral segment II. Specimens at the type locality were taken from under moderate sized stones in knee deep water at the head of a riffle; none were encountered in the riffle itself or in the slack water above. All the specimens seen to date have come from the upper Fly River basin, and southward flowing drainages in the Owen Stanley Range; specimens from the latter region are somewhat larger than those from the type locality but agree in all particulars of structure, coloration, and genitalia. This species is found at lower altitudes than most other members of the genus, all the present records being from below 500 m (ca. 1,600′).

Idiocarus sepikanus, new species
Figs. 3, 11

Description. Brachypterous form: Of small size, ovate, general coloration tan with scattered brown markings. Length 7.70 mm; maximum width 3.73 mm.

Head tan, posterior margin, anteclypeus, and medially along frons and vertex, brown, width/length = 62/52; eyes brown, shining, inner margins straight, convergent anteriorly, separated from head by deep furrows set with pale erect setae, posterior/anterior interocular = 38/30; anteclypeus well produced anteriorly, covering labrum, apex of head distinctly tridentate; labrum projecting far beyond base of rostrum, apex rounded; maxillary plates projecting forward as far as apex of labrum, tan, tips fuscous; antennae short, barely exceeding lateral eye margins; vertex moderately produced behind eyes, margin evenly rounded.

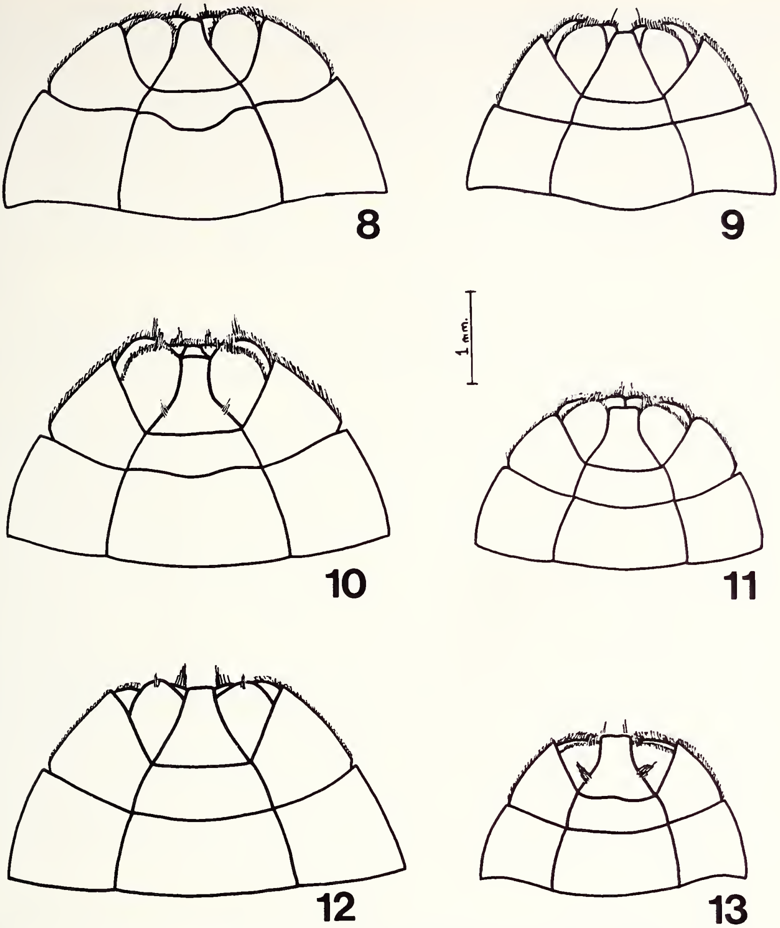
Pronotum tan, midline and areas anterolaterally adjoining eyes, brown, width/length (midline) = 130/50; lateral margins convex, smooth, posterolateral angles rounded, weakly produced; posterior areas excluding posterolateral angles frequently embrowned; surface weakly rugose. Scutellum tan, tip infuscated, surface weakly rugose, width/length = 95/45; lateral margins sinuate. Hemelytra tan, rugose, brachypterous, reaching to base of abdominal tergite II; lateral margins infuscated, explanate, sparsely set with long gold setae.

Abdomen with tergites I–VI exposed, brown, frequently tan along margins and centrally; margins bearing short stiff gold setae, interspersed with very long fine gold setae.

Ventral surface brown, prothorax darker; ventral keel of head strongly carinate, produced anteriorly into a sharp point; prosternal plate weakly carinate medially; mesosternal plate weakly carinate medially, produced into a sharp point distad; static sense organ round, gold, shining, located just inside lateral pronotal margin near midpoint. Legs pale, anterior portion of fore femur black dorsally, set with many small dark raised tubercles, portion adjoining tibia with a fringe of fine gold setae, posterior margin with a fringe of longer gold setae, a row of raised dark tubercles present along midline of ventral face; fore tibia not exceeding adjacent proximal portion of femur; fore coxa with a row of about fifteen small brown tubercles running lengthwise; middle and posterior femora with two rows of tiny brown spines running lengthwise along posterior margins; middle and posterior tibiae set with numerous small brown spines, three transverse rows of stout spines present distally; middle nd posterior tibiae and femora with long gold swimming hairs; claws sharply bent, yellowish, tips black.

Male left paramere with a sharp tooth at apex (see Fig. 3); female subgenital plate trapezoidal, narrowing markedly on posterior half (see Fig. 11).

Macropterous form: Similar to brachypterous form in size and general structure. Wings reaching to base of abdominal segment VI, dark brown; clavus and embolium well delineated, clavus and corium yellowish basally; membrane black. Scutellum enlarged, dark brown, lateral margins not sinuate.



Figs. 8–13. Female subgenital structures of *Idiocarus* species. 8. *I. papuus,* new species. 9. *I. isolatus,* new species. 10. *I. intermedius* La Rivers. 11. *I. sepikanus,* new species. 12. *I. elongatus* Montandon. 13. *I. minor* La Rivers.

Material examined. Holotype ♂, and allotype ♀: PAPUA NEW GUINEA. *East Sepik Prov.:* mountain rainforest stream near Pasam, 300 m (984′), CL 1798, 10.IX.1983 (J. T. and D. A. Polhemus) (BPBM). Paratypes: PAPUA NEW GUINEA. *East Sepik Prov.:* 14♂♂, 10♀♀, 6 nymphs, same data as types (JTP); 14♂♂, 13♀♀, 1 nymph, Nagam River, 17 mi S of Wewak, 6.VII.1969 (I. La Rivers) (CAS); 1♂, 1♀, Nagam River, 3 km S of Pasam, CL 1799, 10.IX.1983 (J. T. and D. A. Polhemus) (JTP); 3♂♂, 1♀, Yemogu Creek, 2 km W of Tring, CL 1805, 12.IX.1983 (J. T. and D. A. Polhemus) (JTP).

Etymology. The name "sepikanus" refers to the Sepik River system, in which this species occurs.

Discussion. I. sepikanus is similar to *I. minor* La Rivers with which La Rivers (1971, fig. 6) confused it. It may be recognized by the female subgenital plate (Fig. 11), the male left paramere (Fig. 3), the long prosternal projection which exceeds the tip of apparent rostral segment II, and the predominantly tan coloration of the dorsum. This species appears to be confined to the Prince Alexander Mountains and other ranges along the northern New Guinea coast. The insects prefer habitats consisting of small to moderate sized stones in shallow, flowing water, and the present records all come from streams in areas of limestone exposure.

Idiocarus papuus, new species
Figs. 2, 8

Description. Brachypterous form: Of moderate size for genus, ovate, general coloration brownish to black with scattered yellow markings. Length 9.25 mm; maximum width 4.30 mm.

Head dark brown, lengthwise patches to either side of midline adjoining eyes yellowish; width/length = 50/70; eyes brown, shining, inner margins straight, convergent anteriorly, separated from frons by distinct furrows set with pale erect setae, posterior/anterior interocular = 40/32; anteclypeus well produced anteriorly, apex tridentate; labrum well developed, brown, apex rounded; maxillary plates oriented vertically, exceeding anterior margin of head, tips pointed, infuscated; antennae slender, terminal segment exceeding lateral eye margin; vertex well produced behind eyes, posterior margin evenly rounded.

Pronotum blackish brown, areas adjoining margins and anterolaterally behind eyes yellow, width/length (midline) = 150/56; lateral margins convex, smooth, weakly explanate, posterolateral angles weakly produced, rounded; surface along midline behind vertex rugose. Scutellum brown to black, occasionally marked with yellow centrally and at anterolateral angles, width/length = 100/60, lateral margins weakly sinuate. Hemelytra brachypterous, reaching only to base of abdominal tergite II, coloration brown, lateral areas darker, set with long gold setae, overall surface weakly rugose.

Abdomen with tergites I–VI exposed, dark brown, frequently marked with yellowish along lateral and posterior margins; lateral margins fringed with short, stiff, gold setae, interspersed with longer fine gold setae.

Ventral surface brown, thorax darker; ventral keel of head sharply produced and pointed anteriorly, tip of point reaching to midpoint of second visible rostral segment; prosternal plate weakly carinate medially; mesosternal plate nearly acarinate medially, produced to a point distad; ovate gold sense organ located inside lateral prothoracic margin near midpoint; abdominal venter with fine hydrofuge pile, producing gold sheen in certain lights, depressed shining ovate sense organs present laterally on paratergites I–VI. Legs yellowish, anterior portion of fore femur black dorsally, set with small raised tubercles, margin adjoining tibia with thick fringe of short gold setae, posterior margin with thick fringe of long gold setae and row of small raised tubercles, row of raised dark tubercles present along midline of ventral face; fore coxa with a row of about 10 raised tubercles running lengthwise; middle and posterior femora with two rows of short brown spines running lengthwise along posterior margins; middle and posterior tibiae set with numerous short reddish spines, apices with five to six transverse rows of stouter spines; middle and posterior tibiae and posterior femora with long gold swimming hairs; claws sharply bent, yellow, tips infuscated.

Male left paramere slender, tip rounded (see Fig. 2); female subgenital plate tapering rather evenly, lateral margins only slightly indented, lacking basal hair tufts, apex without indentation (see Fig. 8).

Macropterous form: Similar to brachypterous form in size, general structure and coloration. Wings black, reaching to tip of abdomen; clavus, embolium and corium well delineated, surface weakly rugose; membrane smooth. Scutellum enlarged, black, shining.

Material examined. Holotype ♂, and allotype ♀: PAPUA NEW GUINEA. *Morobe Prov.:* Oomsis, 35 km SW of Lae on Wau road, 200 m (656′), in shallow rocky stream, CL 1810, 8.IX.1983 (J. T. and D. A. Polhemus) (BPBM). Paratypes: PAPUA NEW GUINEA. *Morobe Prov.:* 43♂♂, 25♀♀, 2 nymphs, same data as types; 10♂♂, 8♀♀, 4 nymphs, Perenin River along Wau road, 200 m (656′), CL 1813, 15.IX.1983; 9♂♂, 15♀♀, 3 nymphs, Poverty Creek, nr. Wau, CL 1816, 16.IX.1983; 9♂♂, 10♀♀, 4 nymphs, Wampit River, 10.7 km N of Mumeng along Wau road, 900 m (2,953′), CL 1833, 19.IX.1983; 7♂♂, 8♀♀, Crystal Creek, nr. Wau, CL 1827, 17.IX.1983; 6♂♂, 3♀♀, stream 1.5 km N of Mumeng, CL 1832, 19.IX.1983; 6♂♂, 2♀♀, stream 17.8 km N of Mumeng on Wau road, CL 1835, 19.IX.1983; 5♂♂, 2♀♀, Gurakor Creek, along Wau road, CL 1814, 15.IX.1983; 3♂♂, 3♀♀, Bamboo Creek, nr. Wau, CL 1817, 16.IX.1983; 5♀♀, 4 nymphs, Clearwater Creek, 3 km S of Mumeng, CL 1831, 19.IX.1983; 3♂♂, Clearwater Creek, nr. Wau, CL 1818, 16.IX.1983; 1♂, stream 18 km N of Lae, CL 1837, 20.IX.1983; 1♀, 2 nymphs, Bulolo River at Wau, 899 m (2,950′), CL 1815, 16.IX.1983. *Western Highlands Prov.:* 19♂♂, 26♀♀, 10 nymphs, Baiyer River, 53 km N of Mt. Hagen, CL 1783, 8.IX.1983; 10♂♂, 5♀♀, 1 nymph, Baiyer River bird sanctuary, CL 1792, 8.IX.1983; 6♂♂, 4♀♀, 1 nymph, Trauna River, nr. Baiyer River, CL 1793, 8.IX.1983; 2♂♂, 4♀♀, 2 nymphs, Walo River, 50 km N of Mt. Hagen, CL 1794, 8.IX.1983. *East Sepik Prov.:* 36♂♂, 38♀♀, 8 nymphs, Arin River, W of Wewak, CL 1803, 11.IX.1983 (all above collected by J. T. and D. A. Polhemus, in BPBM, CAS, and JTP).

Etymology. The name "papuus" refers to the island of New Guinea, to which this species is endemic.

Discussion. I. papuus is the most common species encountered in the Central Highlands of New Guinea, and may be recognized by its moderate size (length exceeding 8 mm), sinuate posterior margin of abdominal sternite V in females (see Fig. 8), and the straight arm on the male left paramere. As with other species of *Idiocarus,* considerable intraspecific variation exists in size and coloration among populations from different river systems, but the internal genital characters hold relatively constant. Individuals from the north coast ranges are smaller and lighter colored, with the upright arm of the male left paramere slightly shortened, while specimens from the central ranges tend to be larger than average and have the rounded tip of the male left paramere more highly expanded. Although these variant populations could easily be designated as subspecies, such action seems premature until the range of geographic variation within the species is more fully understood. Winged specimens of *I. papuus* may be confused with macropterous individuals of *I. inter-*

medius La Rivers on the basis of external characters, although the former species has a generally broader and more robust overall habitus and lacks tubercles on the dorsum of the fore femur; dissection of the male genitalia is often necessary for definitive identification of specimens from the same locality. La Rivers' paratype series of *I. litus* from "Wau Valley, Bulolo River" is actually composed of specimens of *I. papuus*; the same holds true for the majority of other specimens of the now synonymized *I. litus* held in collections.

This species prefers shallow water riffles, where it is often found in large numbers amid small stones and coarse gravels. In larger rivers the insects occur in shallow rocky areas near shore, and rarely out in the deeper sections of the stream. The type locality at Oomsis, lying in low foothills behind the coast at an elevation of only 200 m (656 feet) is one of the lowest localities at which *Idiocarus* have been taken.

LITERATUE CITED

La Rivers, I. 1971. Studies of Naucoridae (Hemiptera). Biol. Soc. Nevada Mem. II: i–iii, 1–120.

Lundblad, O. 1933. Zur kenntnis der aquatilen und semiaquatilen Hemipteren von Sumatra, Java, und Bali. Arch. Hydrobiol., Suppl. Vol. 12, "Tropische Binnengewässer IV," pp. 1–195, 263–489.

Montandon, A. L. 1897. Hemiptera cryptocerata. Fam. Naucordiae. - Sous-fam. Cryptocricinae. Verh. zool.-bot. Ges. Wien 47:6–23.

Parsons, M. C. and R. J. Hewson. 1974. Plastral respiratory devices in adult *Cryphocricos* (Naucoridae: Heteroptera). Psyche 81(3–4):510–527.

Usinger, R. L. 1938. The Naucoridae of the Philippine Islands. Phil. J. Sci. 64:299–309.

Usinger, R. L. 1941. Key to the subfamilies of Naucoridae with a generic synopsis of the new subfamily Ambrysinae. Ann. Entomol. Soc. Amer. 34:5–16.

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